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10/526,766	11/03/2005	Georg Stoppelmann	STOPPELMANN2	6934
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USELDING, JOHN E				
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/526,766

Applicant(s)

STOPPELMANN ET AL.

Examiner

John Uselding

Art Unit

1796

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 2 and 4-20 is/are pending in the application.
- 4a) Of the above claim(s) 12-16 and 20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-11, 17-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB-06)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claim Rejections - 35 USC § 103

Claims 1, 2, and 6-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bagrodia et al. (WO 01/40369) in view of Frank (5,217,762) and Umetsu et al. (6,121,388).

Regarding claims 1, 2, and 6: Bagrodia et al. teach a method of making a polyamide nanocomposite from partially crystalline polyamide (page 3, line 1; claim 3) and an organically modified layered silicate (page 28, line 22 to page 31 line 26 and examples). Bagrodia et al. teach using a double screw extruder, which has an intake (Examples 1 and 3). Bagrodia et al. teach that the process occurs in a single extrusion procedure and that each component is added sequentially (page 38, lines 11-18 and Example 3). Bagrodia et al. teach an embodiment where the amorphous polymer or copolymer is mixed first with the silicate followed by adding polyamide (column 38, lines 13-15). This order is consistent with the broader teachings of Bagrodia et al. Since the layered particles are organically modified they first add the oligomeric or polymeric polyamide resin to minimize degradation of the layered silicate (page 37, lines 1-2). Less than 25% of the entire composition is added (page 24, lines 18-26). Bagrodia et al. teach that the polyamide resin is added as pellets, ground chips, or powder (page

36, lines 17-22), which are granulates. The organically modified layered silicate is added next. About 0.5 to about 10 wt % in terms of the entire composition is used (page 26, lines 15-21).

While the range of components overlaps the range of part (b) of the claim Bagrodia et al. fail to teach the same claimed range.

The subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made, since it has been held that choosing the overlapping portion, of the range taught in the prior art and the range claimed by the applicant, has been held to be a *prima facie* case of obviousness, see *In re Malagari*, 182 USPQ 549. Also Bagrodia et al. teach an example where it is 82 wt% polyamide and 18 wt% silicate (Example 3). Those numbers are close enough to the claimed range that the skilled artisan would expect the composition to have similar properties. A *prima facie* case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985) (MPEP 2144.05).

Finally the second part of the polyamide (matrix polymer) is added to the extruder. Bagrodia et al. teach an example where the final concentration of the silicate is 4.6% (Example 3).

Bagrodia et al. fails to teach adding the second part of the polyamide via a side feeder.

However, Umetsu et al. teach that when using a double screw extruder and mixing a polyamide resin composition in stages to add the later stage polymer through a side feeder (column 9, lines 29-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add the second part of the polyamide via a side feeder as taught by Umetsu et al. in the method of Bagrodia et al. to provide a suitable means to add the polyamide to the melt.

Bagrodia et al. teaches filtration (page 31, lines 14-17) but they fail to teach the location of the filtration, the step the filtration occurs in, and the mesh size of the filters used.

Frank teaches a method of melt processing thermoplastic polymer such as polyamides to reduce the irregularities in extrusion (column 1, lines 16-69). Frank teaches that inserting a filter in line after the extruder to reduce flow irregularities (column 6, lines 1-5). It would have been obvious to have placed the filter either before or after the extruder nozzle in the absence of unexpected results.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the filtration method of Frank in the process of Bagrodia et al. to provide a process of producing a polyamide nanocomposite with reduced flow irregularities. It would have been obvious to have performed the melt filtration during the extrusion process.

Regarding claim 7: Bagrodia et al. teach that the layered silicates are organically modified using phosphonium salts that meet the claimed formula (page 29, lines 14-35).

Regarding claim 8: Bagrodia et al. teach that the silicates are exfoliated (page 11, lines 11, 22-30) and are ultrafine with at least one dimension of less than or equal to 100 nm (page 11, lines 22-30; page 27, lines 1-14).

Regarding claim 9: Bagrodia et al. teach that the preferred polyamides are nylon 6 and nylon 6,6 (page 19, lines 19-25).

Regarding claim 10: the partially crystalline polyamides are admixed with a component of amorphous polyamide (page 12, lines 28-31 and Examples).

Regarding claim 11: Bagrodia et al. teach that the organically modified layered silicates are phyllosilicates of the three-layer type (2:1) (page 27, lines 26-27).

Claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bagrodia et al. (WO 01/40369), Frank (5,217,762), and Umetsu et al. (6,121,388) as applied to claim 1 above further in view of Maxfield (WO 93/04117).

Bagrodia et al. fails to teach what size mesh filter to use in their filtration

Frank teach that one can modify his design depending on the composition used (column 6, lines 48-54). Since Bagrodia et al. is silent with respect to the filter size the skilled artisan would look to the prior art to find a suitable filter size. Maxfield is being used to show that a 75 micron filter size (page 39, 1-10) has been used for polymer nanocomposites made from polyamides and organically modified layered silicates.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to set the filter size at 75 microns in the method of Bagrodia et al.

so as to retain the benefits of Frank while using a filter size that has been demonstrated to be effective in the art.

Claims 1, 2, 4-6 and 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maxfield et al. (WO 93/04117) in view of Frank (5,217,762) and Umetsu et al. (6,121,388).

Regarding claims 1-6, 9, 11 Maxfield et al. teach a method of producing a polyamide nanocomposite from a partially crystalline polyamide such as nylon 6 or nylon 66 (page 28, lines 12-20 and examples) and organically modified layered silicates that are phyllosilicates of the three-layer type (2:1) (page 7, line 23 to page 15, line 20, examples). Maxfield et al. teach dosing the polyamide in a double screw extruder and melting it followed by adding modified layered silicate into the extruder (page 30, lines 15-37, and examples). Maxfield et al. teach that the mixing ratio of polyamide to silicate is without limitation (page 3, line 36 to page 4, line 5). They teach examples where the modified layered silicate is less than 10% of the polyamide nanocomposite (Tables 2 and 4). They teach examples where the modified layered silicate has a final concentration of 2.5% and 2.95% (Tables 2 and 4) and Maxfield et al. teach adding the polymer as a granulate (page 7, lines 30-34).

Maxfield et al. differs from the Applicant's claim in that they add the polyamide all in one step instead of mixing part of the polyamide with the silicate and then adding the rest of the polyamide later.

The difference consists in a difference of the order of mixing the components. The selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results. See MPEP 2144.04. *In re Burhans*, 154 F.2d 690, 69 USPQ 330 (CCPA 1946) (selection of any order of performing process steps is *prima facie* obvious in the absence of new or unexpected results); see also *In re Gibson*, 39 F.2d 975, 5 USPQ 230 (CCPA 1930) (Selection of any order of mixing ingredients is *prima facie* obvious.). In the absence of unexpected results it would have been obvious to add all the polyamide at once or to add it in stages. Since the final concentration of the layered silicate is the same the total amount of the polyamide added must also be the same. It is known in the art that when using a double screw extruder and mixing a polyamide resin composition in stages to add the later stage polymer through a side feeder. See Umetsu et al. (column 9, lines 29-49).

Maxfield et al. fail to teach filtering their melt, the location of the filtration, the step the filtration occurs in, and the mesh size of the filters used.

Frank teaches a method of melt processing thermoplastic polymer such as polyamides to reduce the irregularities in extrusion (column 1, lines 16-69). They teach that inserting a filter in line after the extruder to reduce flow irregularities (column 6, lines 1-5). It would have been obvious to have placed the filter either before or after the extruder nozzle in the absence of unexpected results.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the filtration method of Frank in the process of

Maxfield et al. to provide a process of producing a polyamide nanocomposite with reduced flow irregularities.

Frank teach that one can modify his design depending on the composition used (column 6, lines 48-54). Since Maxfield et al. filtered their silicate at 75 microns (page 39, lines 1-10) it would have been obvious to one of ordinary skill in the art at the time the invention was made to set the filter size at 75 microns so as to retain the benefits of Frank without causing harm to the composition of Maxfield et al.

Regarding claim 8: Maxfield et al. teach that their silicate material is exfoliated (page 3, lines 20-24; page 4, lines 25-28). Maxfield et al. teach that the average particle size of the silicate has one dimension that is less than 100 (page 5, lines 13-20)

Regarding claim 10: Maxfield et al. teach that their polyamide is a mixture of polyamides (column 25, lines 32-34) which includes amorphous polyamides (page 26, lines 13-17).

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maxfield et al. (WO 93/04117), Frank (5,217,762), and Umetsu et al. (6,121,388) as applied to claim 1 above in view of Oswald (4,136,103).

Maxfield et al. and Frank teach what is listed above.

While Maxfield et al. does teach that the organic modifier for montmorillonite can be a phosphonium salt with alkyl groups and Cl, Br, or I (page 7, line 23 to page 15, line 20) they fail to teach the exact structure as claimed.

Oswald teach a phosphonium salt modified montmorillonite (column 12, lines 34-68). It provides thermal stability and reinforcement at the same time (column 3, lines 42-46). They teach that it is modified using phosphonium salts of the formula $P-R_4$ (page 3, line 58). The R substituents is preferably an alkyl or substituted alkyl with 40 carbons (column 3, lines 65-66). The alkyl can be substituted with a Cl, Br, or I (column 4, line 8). The phrase "three alkyl or aryl residues" can be interpreted in a multitude of ways. The examiner takes the position that the applicant is referring to an alkyl group that has at least 3 carbon atoms. Any number of carbons over three can just be divided into 3 separate alkyl groups. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected at least 3 carbons from the 3-40 carbon range and substitute the alkyl with a Cl, Br, or I. Oswald also teaches montmorillonite modified by trialkyl phosphonium chlorides (column 13, lines 48-49).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the montmorillonite modified with a phosphonium salt of Oswald as the montmorillonite modified by an organic salt of Maxfield et al. to provide both reinforcement and thermal stability to their composition.

Claim 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (JP 2000-322919).

Fujimoto et al. teach making lamp reflectors for exterior illumination [0001-0002]. One of ordinary skill would immediately envisage a reflector for vehicle driving illuminations, signal, or street lights as species of the lamp reflectors genus. It is noted

that the particular reflectors claimed are merely intended uses of the molding compounds. The polyamide nanocomposite molding compound comprises partially crystalline polyamide [0009] and organically modified layered silicates [0011-0015]. The layered silicate is 1-10% of the composition [0014]. They teach an example where it is 4% [0019]. Since the composition of Fujimoto et al. is the same as claimed and the process is similar it is the position of the Office that the nanocomposite of Fujimoto et al. possesses the claimed characteristics of the polyamide nanocomposite molding compound. Fujimoto et al. teach the method of injection molding the nanocomposite into a reflector [0017].

Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fujimoto et al. (JP 2000-322919) as applied to claim 17 above further in view of Catlin (5,819,408).

Fujimoto et al. fails to teach gas injection molding during injection molding.

Catlin teaches gas injection molding of thermoplastic resins into parts to provide variable thickness in the adjacent sections in the same mold, and produce stiff lightweight parts. This is taught as an improved alternative to injection molding (column 16, lines 29-35).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have used the gas injection molding process of Catlin during the injection molding to make the reflector of Fujimoto et al to provide variable thickness in the adjacent sections in the same mold, and produce stiff lightweight reflectors.

Response to Arguments

Applicant's arguments filed 10/20/2009 have been fully considered but they are not persuasive.

The Applicant has alleged unexpected results of higher dispersibility and surface quality by dosing the polyamide in distinct steps. This is not persuasive because the Applicant does not have any data to support the assertion. The only comparative example appears to use the same dosing method but uses a calcium carbonate in place of the silicate and in a significantly higher amount. The Applicant does not have comparative examples to support unexpected results over the method of Maxfield et al. (adding all of the polyamide at once instead of dosing in two stages). Also Bagrodia et al. teach the method of dosing the polyamide in distinct steps.

The Applicant has made the argument that matrix in Bagrodia et al. is amorphous whereas in the claimed invention it is partially crystalline. It is noted that the matrix is not a claimed component. The claims do not exclude the possibility that the first polyamide is amorphous. In fact, a later claim necessitates that at least a part of the polyamide is amorphous (claim 10). Therefore the first polyamide being amorphous and the second polyamide being partially crystalline meet the claimed limitations for the polyamides.

The Applicant has asserted that Bagrodia et al. teach an oligomer and not a polymer. The claims do not exclude the possibility of an oligomer. What is claimed is a

polyamide. An oligomer is also a polyamide. Also, Bagrodia et al. is not limited to oligomers but also teaches polymers (page 38, lines 11-13).

The Applicant has asserted that Maxfield et al. explicitly discloses that the manner in which the mixture is formed is not critical. That is also the position of the Office. The Applicant has not provided any evidence to rebut that position, which is supported by the prior art.

The Applicant has state that for an obvious selection of an order of mixing steps these steps must be known. The steps are known. It is known that one can all of one component at a time or in stages. Therefore, in the absence of unexpected results it is obvious to add all of one component at a time or in stages.

With regard to the filtration step the Applicant has discussed the reference individually and not in combination. One cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

The Applicant has asserted that Frank does not deal at all with the problem of the present invention, namely low dispersibility. The prior art need not have the same motivation to combine the reference as the Applicant has. The fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. &

Inter. 1985). Also, the Applicant has not shown that the filtration leads to an unexpected improvement in dispersibility of the layered silicates.

The Applicant has asserted that the amendments to claims 17 and 18 remove the product by process limitations. This is incorrect. The claims still include a polyamide nanocomposite made by the method of claim 1, which is a nested product by process limitation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Uselding whose telephone number is (571)270-5463. The examiner can normally be reached on Monday-Thursday 6:00am-4:30pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Milton Cano can be reached on 571-272-1398. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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